UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,016	08/25/2003	Matthew Lee McCullough	M023-1001	9553

7590 12/11/2006

William G. Lane P.C.
16481 Laguna Canyon Road #250
Irvine, CA 92618

EXAMINER	
WARTALOWICZ, PAUL A	

ART UNIT	PAPER NUMBER
1754	

DATE MAILED: 12/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/649,016	MCCULLOUGH, MATTHEW LEE	
	Examiner	Art Unit	
	Paul A. Wartalowicz	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *57-111* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *57-111* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 58 is objected to because of the following informalities:

It appears that claim 58 should include --The process according to claim 57-- or some equivalent recitation at the beginning of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 59, 66, 70, 78, 80, 91, 95, 101, 102, 106, and 110 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitations of the above claims constitute new matter. Applicant needs to point out support of the claim limitations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 57, 59-66, 68-78, 80-91, 93-95, 97-108, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cioffi et al. (5676738) in view of any one of Itoh et al. (U.S. 4729834), de Ruiter et al. (U.S. 5616169); any one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. (5601790).

Cioffi et al. teaches a process for VOC control and recovery. Cioffi et al. teaches that a contaminated air stream is passed through a bed of synthetic adsorbent (including polymeric adsorbent, Column 2, lines 32-55), spent adsorbent is removed for regeneration (Column 3, lines 19-36), regenerating at elevated temperature which may be achieved by a microwave heat source and in the presence of a carrier gas such as inert gas and wherein the oxygen content is controlled (Columns 3-4, lines 34-15 respectively) before or during contact with the carrier gas (Throughout document, particularly col. 3, lines 59-62), cooling the adsorbent (Column 4, lines 18-20), replacing the regenerated adsorbent back into the adsorption bed (Column 4, lines 21-33) and contacting the desorbate stream containing the vapors stripped from the adsorbent with an oxidizer (Column 4, lines 40-52; Column 6, lines 22-33) before being released to the atmosphere. Cioffi et al. also teaches that the desorbate stream, after oxidizing, can be passed through a liquid-cooled heat exchanger and then used directly (Column 6, lines 34-46). Cioffi et al. further teaches that VOCs can be destroyed by UV light (Column 5, lines 20-25). Although Cioffi et al. teaches that the vapors are destroyer in an oxidizer, Cioffi et al. is silent as to the specific type of oxidizer used and is also silent as to any

additional steps for removal of acid gas. Cioffi is also silent as to the polymer adsorbent used in the process of the invention.

Mason teaches (see [0050], [0052], [0053]) that VOCs are oxidized in reactor (12) which includes metal catalysts and therefore meets the claim limitation of destruction of vapors using a catalytic oxidizer. Mason also further teaches that after this step it may be desirable to neutralize residual remaining acid gases in the gas stream in a downstream caustic scrubbing step (see [0055].

Michalakos et al. (6503462) teaches that VOCs may be oxidized over a catalyst (Column 3, lines 11-25) and that by-product acid gases are then removed by an adsorbent (Column 3, lines 26-28).

Michalakos et al. (20020193064) teaches that VOCs may be oxidized over a catalyst and that by-product acid gases are then removed by an adsorbent (see [0016]).

Stilger et al. teaches a method for the destruction of VOCs wherein the VOCs are destroyed in an oxidizer such as a thermal or catalytic oxidizer (Column 4, lines 1-9) at a time and temperature sufficient to achieve the desired result (Column 4, lines 14-17) and that the gas stream is then preferably passed through an acid gas scrubber (Column 4, lines 29-33) before being released to the atmosphere.

It would have been obvious to modify the method of removing VOCs which includes oxidizing the gas stream and releasing it to the atmosphere as taught by Cioffi et al. by *catalytically* oxidizing the gas stream *and* treating it to remove acid gas prior to release into the atmosphere because each one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), and Stilger et al. (5601790) teach

that VOCs are can be removed/destroyed by passing the gas stream through a catalytic oxidizer and that after this it is desirable to remove acid gas from the stream before releasing it to the atmosphere. Thus it would be obvious to catalytically oxidize as Cioffi et al. is silent as to any specific type of oxidizing and is therefore open to any oxidizing known in the art for the treatment of VOCs and it is also obvious to further include a step of removing acid gases as the prior art teaches that such additional step is desirable after catalytic oxidizing.

de Ruiter et al. teach it is known that polymeric adsorbents comprise styrene resins (Throughout document, particularly claim 21).

Itoh et al. teaches that polymeric adsorbents comprising styrene are known in the art (Throughout document, particularly column 7).

Therefore, it would have been obvious to one of ordinary skill in the art to use styrene as the polymer in Cioffi et al. because de Ruiter et al. and Itoh et al. teach that polymeric adsorbents containing styrene are known in the art. Additionally, Cioffi et al. is silent as to what compositions the polymer comprises, such that Cioffi et al. is open to different polymers such as styrene.

With respect to claims 65 and 85, Cioffi et al. teaches that the adsorbent may be Ambersorb 563 which is hydrophobic.

With respect to claims 64,68,84,105, and 108, Cioffi et al. teaches that the exhaust stream may be used directly in the adsorber (Column 4, lines 53-55) or, with

respect to claims 66,91, and 106, that the final exhaust stream may also be used to provide heat (Column 4, lines 44-45 and 66-67) therefore achieving heat recovery.

It would have been obvious to one of ordinary skill in the art to heat the regenerating air stream by passing it through warm regenerated synthetic adsorbent to cool the regenerated synthetic adsorbent and to warm the regenerating air stream before it is used to regenerate spent synthetic adsorbent because it is known to use heat recovery as taught in Cioffi et al.

Claims 58,79, 96, and 111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cioffi et al. (5676738) in view of any one of Itoh et al. (U.S. 4729834), de Ruiter et al. (U.S. 5616169); and any one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. (5601790) as applied to claims 57, 72, and 96 above, and further in view of either one of Kotagiri et al. (6478854) or Atkins et al. (4256712).

With respect to claims 96 and 111, Cioffi et al. teaches that the adsorbent may be Ambersorb 563 which is hydrophobic and Cioffi et al. teaches that the exhaust stream may be used directly in the adsorber (Column 4, lines 53-55). Cioffi et al. in view of any one of Mason, Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. teach the process as described with respect to claims 57, 72, and 96 above. Cioffi et al. does not teach that the regeneration is performed under a vacuum.

Kotagiri et al. teaches that a reduced pressure, achieved via vacuum, is desirable in the regeneration of adsorbent since it facilitates desorption (Column 13, lines 12-18). Thus, it would be obvious to perform the regeneration as taught by Cioffi et al. under vacuum conditions because vacuum conditions facilitate desorption of the sorbent, as taught by Kotagiri et al.

Atkins et al. teaches that when using a vacuum during sorbent regeneration, a lower regeneration temperature is required (Column 4, lines 43-47). This it would be further obvious to perform the regeneration as taught by Cioffi et al. under vacuum conditions because the vacuum conditions reduce the temperature required to perform regeneration as taught by Atkins et al., desirably resulting in significant savings in energy use.

Claims 67,92, and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cioffi et al. (5676738) in view of any one of Mason (2004/0024279), Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. (5601790) as applied to claims 57, 72, and 96 above, and further in view of either one of D'Souza (5453259) or Rose et al. (5435141).

Cioffi et al. in view of any one of Mason, Michalakos et al. (6503462), Michalakos et al. (20020193064), or Stilger et al. teach the process as described with respect to claims 57, 72, 96 above. Cioffi et al. does not teach that the initial contaminated gas stream is cooled prior to passing it through the adsorbent.

D'Souza teaches that sorbents are most effective at adsorbing VOCs when cool. Thus it would be obvious to cool the VOC-containing gas stream of Cioffi et al. prior to contact with the adsorbent to increase the effectiveness of this step.

Rose et al. teaches that cooling causes VOCs to precipitate from a gas stream. Thus it would have been obvious to cool the VOC-containing gas stream of Cioffi et al. prior to contact with the adsorbent to aid in the removal of the VOCs since as Rose et al. teaches the cooling cause the VOCs to precipitate out of the gas stream, facilitating removal.

Response to Arguments

Applicant's arguments filed 10/2/06 have been fully considered but they are not persuasive.

Applicant argues that Cioffi et al. is directed to a process employing pyrolyzed adsorbent and that a pyrolyzed adsorbent is not equivalent to the adsorbent used in the present invention and that it appears that the '738 process employs a form of activated carbon from the pyrolysis that is regenerated employing high temperature conditions with a stripping gas.

However, the claim uses comprising type open language (i.e. containing) such that the adsorbent of the invention is not limited to only consisting of styrenic polymer, but can also contain, for example, pyrolyzed carbon. Cioffi et al. teaches that the pyrolyzed carbon pellets are combined with polymeric absorber (col. 1, lines 50-54). Styrene is a well-known polymer adsorber in the art.

As to the argument that it appears the reference employs high temperature conditions with a stripping gas, it seems the applicant is arguing that the temperatures of the stripping gas cause some degree of pyrolysis or would damage the styrenic polymer of the invention. This is not persuasive because it seems unlikely that temperatures would be employed that would damage the polymer adsorbent of the invention. Additionally, the high temperature stripping gas is only one embodiment of the invention and the reference is not limited to this embodiment.

Applicant argues that the process in Mason pyrolyzes the waste material to fragment the organic material into smaller organic molecules which report to a gas stream and that steam is injected at about 800 to 1000°C far in excess of any temperature employed in the present process and that the '279 publication is not relevant to the present invention as presently claimed.

However, the presently claimed invention uses open-type comprising language (i.e. comprising, containing) such that pyrolyzing the waste material to fragment the organic material into smaller organic molecules which report to a gas stream can be included in the reference without teaching away from the presently claimed invention. The limitation of the temperature of the present process is a feature not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., temperature of the process) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read

into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally, it appears the applicant is pointing to deficiencies in Mason for which Mason is not relied upon. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Michalakos et al. ('462) does not disclose the use of an adsorbent to remove contaminants from an air stream and it does not teach how to reduce the contaminant in an air stream to ultra low levels.

However, Michalakos et al. ('462) is not relied upon to disclose the use of an adsorbent to remove contaminants from an air stream and it does not teach how to reduce the contaminant in an air stream to ultra low levels. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Stigler does not teach a method of adsorbing low concentration HAPs or any other contaminants on a synthetic adsorbent containing styrenic polymers and then regenerating the synthetic adsorbent and having a captured

HAPs report to a regeneration gas stream in much higher concentrations wherein that gas stream is treated to remove the HAPs either by oxidation, condensation, or adsorption on a material that can be disposed of.

However, Stigler is not relied upon to teach a method of adsorbing low concentration HAPs on a synthetic adsorbent containing styrenic polymers and then regenerating the synthetic adsorbent and having a captured HAPs report to a regeneration gas stream in much higher concentrations wherein that gas stream is treated to remove the HAPs either by oxidation, condensation, or adsorption on a material that can be disposed of. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, the limitation of a method of adsorbing **low concentration** HAPs (emphasis on the limitation in question) is a feature not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., of a method of adsorbing **low concentration** HAPs) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that the process steps and the methods of removing contaminants from gas streams different in the prior art processes from the claim process, they also are directed to treating the contaminants of different types of gas streams.

However, Cioffi et al. teaches that a contaminated air stream is passed through a bed of synthetic adsorbent (Column 2, lines 32-55). This is substantially as that of the claimed invention. The other references are not relied upon to teach the contaminated air stream limitation.

Applicant argues that the present process is directed to treating gas streams with low concentrations of HAPs to achieve ultra low concentrations of HAPs in the gas stream.

However, the limitation of treating gas streams with **low concentrations** of HAPs is a feature not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., treating gas streams with **low concentrations** of HAPs) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). As to the limitation of achieving ultra low concentrations of HAPs in the gas stream; the prior art of record teach that pollutants are removed and that the pollutants would be reduced to a predetermined "ultra-low" standard.

Applicant argues that none of the processes take a synthetic adsorbent and regenerate it without changing its characteristics such as by heating it and regenerating it with a passage of gas under conditions it does not destroy the synthetic adsorbent and does not affect its adsorbent capacity.

However, with respect to Cioffi et al., this is not persuasive because it seems unlikely that temperatures would be employed that would damage the polymer adsorbent of the invention. The high temperature stripping gas is only one embodiment of the invention and the reference is not limited to this embodiment. Additionally, the limitation of regenerating the adsorbent without changing its characteristics such as by heating it and regenerating it with a passage of gas under conditions it does not destroy the synthetic adsorbent and does not affect its adsorbent capacity is a feature not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., regenerating the adsorbent without changing its characteristics such as by heating it and regenerating it with a passage of gas under conditions it does not destroy the synthetic adsorbent and does not affect its adsorbent capacity) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
December 4, 2006

Steve Bos
Primary Examiner A.U. 1754